

Claims

1. A method of producing a stereoregular head, tail-poly(alkylene D-glucaramide), the method comprising the steps of:
 - a) esterifying an amidoamino acid in an alcohol under conditions that limit alcoholysis of the amide bond;
 - b) polymerizing the esterified amidoamino acid in a protic solvent in the presence of a tertiary amine to form a stereoregularly improved prepolymer; and
 - c) polymerizing the stereoregularly improved prepolymer in a solvent to form the stereoregular head, tail-poly(alkylene D-glucaramide).
2. The method of claim 1, wherein said alcohol is selected from the group consisting of methanol, ethanol, propanol and isopropanol containing a strong acid.
3. The method of claim 1, wherein said method further comprises the step of, after a), isolating said esterified amidoamino acid by solvent removal under mild conditions.
4. The method of claim 1, wherein said amidoamino acid is selected from the group consisting of 6-[N-(2'-aminoethyl)]-D-glucaramide and salts thereof, 6-[N-(4'-aminobutyl)]-D-glucaramide and salts thereof, 6-[N-(6'-aminohexyl)]-D-glucaramide, and salts thereof, and 6-[N-(12'-aminododecyl)]-D-glucaramide, and salts thereof.
5. The method of claim 1, wherein said protic solvent is selected from the group consisting of methanol, ethanol, propanol, and isopropanol.
6. The method of claim 1, wherein said solvent is selected from the group consisting of a protic polar solvent, an aprotic polar solvent and mixtures thereof.

7. The method of claim 1, wherein said stereoregular prepolymer is polymerized in a solvent in the presence of a tertiary amine.

8. A product produced by steps a and b of the method of claim 1, wherein said amidoamino acid is a sodium salt of 6-[N-(2'-aminoethyl)]-D-glucaramide.

9. A product produced by steps a and b of the method of claim 1, wherein said amidoamino acid is a sodium salt of 6-[N-(4'-aminobutyl)]-D-glucaramide.

10. A product produced by steps a and b of the method of claim 1, wherein said amidoamino acid is a sodium salt of 6-[N-(6'-aminohexyl)]-D-glucaramide.

11. A product produced by steps a and b of the method of claim 1, wherein said amidoamino acid is a sodium salt of 6-[N-(12'-aminododecyl)]-D-glucaramide.

12. A product produced by the method of claim 1, wherein said amidoamino acid is 6-[N-(2'-aminoethyl)]-D-glucaramide and said stereoregular head,tail-poly(alkylene D-glucaramide) has the formula $C_8H_{14}O_6N_2$.

13. The product of claim 12, wherein said stereoregular head,tail-poly(alkylene D-glucaramide) has a degree of polymerization of about 8.0, an average molecular weight of about 1,874 and an estimated molecular weight of about 3,841.

14. A poly(ethylene D-glucaramide) having a number average molecular weight of about 1,874 and an estimated weight average molecular weight of about 3,841.

15. A product produced by the method of claim 1, wherein said amidoamino acid is 6-[N-(4'-aminobutyl)]-D-glucaramide and said stereoregular head,tail-poly(alkylene D-glucaramide) has the formula $C_{10}H_{18}O_6N_2$.

16. The product of claim 15, wherein said stereoregular head,tail-poly(alkylene D-glucaramide) has a degree of polymerization of about 30.0, a number average molecular weight of about 7,868 and an estimated weight average molecular weight of about 16,129.

17. A poly(ethylene D-glucaramide) having a number average molecular weight of about 7,868 and an estimated weight average molecular weight of about 16,129.

18. A product produced by the method of claim 1, wherein said amidoamino acid is 6-[N-(6'-aminohexyl)]-D-glucaramide and said stereoregular head,tail-poly(alkylene D-glucaramide) has the formula $C_{12}H_{22}O_6N_2$.

19. The product of claim 18, wherein said stereoregular head,tail-poly(alkylene D-glucaramide) has a degree of polymerization of about 42.7, a number average molecular weight of about 12,400 and an estimated weight average molecular weight of about 25,410.

20. A poly(ethylene D-glucaramide) having a number average molecular weight of about 12,400 and an estimated weight average molecular weight of about 25,410.

21. A product produced by the method of claim 1, wherein said amidoamino acid is 6-[N-(12'-aminododecyl)]-D-glucaramide and said stereoregular head,tail-poly(alkylene D-glucaramide) has the formula $C_{18}H_{34}O_6N_2$.

22. The product of claim 21, wherein said stereoregular head,tail-poly(alkylene D-glucaramide) has a degree of polymerization of about 17.6, a number average molecular weight of about 6,590 and an estimated weight average molecular weight of about 16,477.

23. A poly(ethylene D-glucaramide) having a number average molecular weight of about 6,590 and an estimated weight average molecular weight of about 16,477.